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Code 840, Range and Mission Management Office

National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Project Plan

Range Support Services for Orbital Sciences Corporation's
Commercial Resupply Services (CRS) Program

Effective Date: May 14, 2014



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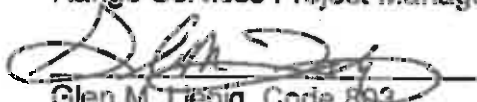
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Approved,


 Jeffrey A. Reddish, Code 840
 Range Services Project Manager, WFF

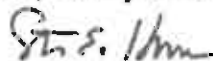
5/7/14

Date


 Glen M. Liesig, Code 893
 Chief, Safety Office, WFF


5/9/14

Date


 Steven E. Kremer, Code 840
 Chief, RIMMO, WFF

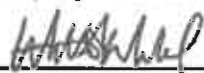
5/9/2014

Date


 David L. Pierce, Code 800
 Deputy Director, WFF

5/14/14

Date


 William A. Wrobel, Code 800
 Director, WFF


14 MAY 2014

Date

Reviewed,

Mike Bitzer
 OSC Mission Manager

Date


 Sean Mulligan
 Director MARS

5/7/14

Date

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Approved,


 Jeffrey A. Reddish, Code 840
 Range Services Project Manager, WFF

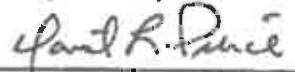
4/22/14
 Date

Glen M. Liebig, Code 803
 Chief, Safety Office, WFF

Date

Steven E. Kremer, Code 840
 Chief, RMMO, WFF

Date

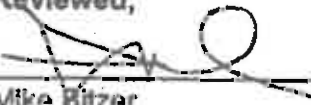

 David L. Pierce, Code 800
 Deputy Director, WFF

5/14/14
 Date

William A. Wrobel, Code 800
 Director, WFF

Date

Reviewed,


 Mike Bitzer
 OSC Mission Manager

4/22/14
 Date

Sean Mulligan
 Director MARS

Date

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1.0 PROJECT OVERVIEW

1.1 INTRODUCTION

This Project Plan describes the plan that each Antares mission will utilize for WFF Range support within the CRS Program. The Commercial Resupply Service (CRS) Program is a series of missions sponsored by the National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) and provide cargo transport to the International Space Station (ISS) for ISS re-supply. After an Antares mission delivers Cygnus into the agreed to orbit, the spacecraft will rendezvous with ISS, be grappled by the ISS arm, berthed to the ISS, hatch opened, cargo delivered, hatch closed, unberthed, released, and returned to Earth by destructive re-entry.

Orbital and NASA are partnered with the Virginia Commercial Space Flight Authority (VCSFA), which owns and operates the Mid-Atlantic Regional Spaceport (MARS), to use the facilities and range located at the Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF) in Virginia to launch Orbital's Antares launch vehicle. VCSFA is providing the launch complex, Pad 0A, and related support services. Information about VCSFA can be found at <http://www.marsspaceport.com>.

WFF will provide all range support services, including data acquisition, safety, and range logistics functions. In addition the following WFF facilities will be used by Orbital: the Horizontal Integration Facility (HIF), Payload Processing Facilities (PPF), Spacecraft Fueling Facility, Project Support Facilities, Ordnance Storage Facility, Launch Control Center, (LCC), Mission Control Center (MCC), Range Control Center (RCC) and the Foreign National Control Center.

This Range and Mission Management Office (RMMO) maintained project plan written in accordance with NPR 7120.5E, NASA Space Flight Program and Project Management Requirements for a Category 3 project is covering the WFF range services support the CRS Program.

1.2 OBJECTIVES

WFF's objectives, in its lead range role, are to:

- Provide launch team access to and successful use of facilities and support systems required to ship, accept, integrate, transport, erect, and checkout the Antares launch vehicle and its Cygnus. Successful provision of these services will include:
 - Access to all required WFF work areas in a timely, unencumbered manner.
 - Timely access to cranes, lifts, and other equipment required to process the Antares launch vehicle and Cygnus spacecraft in a safe manner.

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- Timely access to functional workspaces (including data and communications capabilities) such as offices, labs, and other work areas for the onsite team. Tools, vehicles, and other assets are provided by the customer.
- Oversight and logistical support for the customer's operations team during lift, integration, and preparation to ensure safe use of WFF facilities and services.
- Provide the project with reliable instrumentation services. Successful provision of these services will include:
 - Radar services
 - Telemetry services.
 - Command destruct capability throughout commanded portions of flight as required by flight safety plans.
 - Control center services.
 - Weather data collection and forecasting services.
 - Photo and video documentation services.
 - Spectrum Management.
 - Data products following the launch.
- Provide safety support for flight and ground elements of the Antares rocket and payload sufficient to ensure the safety of the public, on-site personnel, and high value assets. Successful provision of these services will include:
 - Identification and mitigation of risks associated with ground handling of the Antares launch vehicle and Cygnus spacecraft.
 - Development and mitigation of risks associated with flight operations including over flight and flight termination events.
 - Development of detailed flight and ground safety plans assessing risks and risk mitigation strategies.
 - Ensuring and verifying that operational plans are executed in a safe manner.
 - Evaluations of air and sea surveillance status to ensure required areas are clear.
- Provide project management support for range functions sufficient to ensure smooth integration of WFF efforts and responsiveness to the customer's needs. Provision of these services will include:

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- Requirements management of all areas of WFF responsibility.
- Provision of cost, budget, technical plans, and tracking and reporting of status of same using WFF and/or customer-defined formats.
- Development, maintenance, and execution of integrated schedules, including those required reviews and milestones required for launch approval from WFF.
- Development and maintenance of agency or interdepartmental agreements obtaining required services from other entities.

Orbital's objectives:

- Utilize the Antares launch vehicle and the Cygnus spacecraft to deliver cargo to the ISS.
 - Continue to collect flight data of the Antares launch vehicle.
 - Activate Cygnus Systems, ascend to the Rendezvous Point.
 - Rendezvous, Capture and Berth with the International Space Station.
 - Open Hatch and Deliver Cargo to the ISS.
 - Receive and dispose of trash from the ISS.
 - Unberth, ungrapple and de-orbit to a destructive re-entry.

VCSFA objectives are to support the customer, Orbital's, requirements for the Antares mission, including timely provision of the following hardware, capabilities, and services in operationally ready status:

- Provide the Pad 0A Medium Class Launch Facility (MCLF) including the following systems and subsystems:
 - Launch Mount (LM) with associated exposed areas nominally hardened.
 - Pad-mounted Hydraulic System for erecting Transporter Erector Launcher (TEL).
 - Liquid Fueling Facility (LFF) with adequate amount of required commodities.
 - Environmental Control System (ECS) supporting sub-cooled LFF commodities.
 - Deluge System for heating suppression and acoustic suppression.
 - Piling reinforced ramp and launch area to accommodate TEL transporters.
- Provide program management support related to provision of MARS Pad 0A MCLF capabilities and supporting services including the following aspects:

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- Provide cost, budget, technical plans, and tracking and reporting of status of same using VCSFA and/or customer-defined formats.
- Develop, maintain, and execute integrated schedules including the required reviews and milestones required for the approval process.
- Participate in and support the development and maintenance of agreements to conduct the launch.
- Provide an environment with an emphasis on safety within the VCSFA MARS area of responsibility, including the following:
 - Utilize a safety plan to assess risks and define risk mitigation strategies for operations at Pad 0A MCLF.
 - Identify and mitigate risks associated with handling of the flight article at Pad 0A MCLF.
 - Identify and mitigate risks associated with operations at Pad 0A MCLF.
 - Ensure and verify that operational plans are executed in a safe manner at Pad 0A MCLF.

1.3 MISSION DESCRIPTION AND TECHNICAL APPROACH

The Antares is a two-stage launch vehicle designed to provide responsive, cost-effective, and reliable access to orbit for Medium-Class payloads weighing up to 6500 kg. The Antares first stage is powered by dual AJ26-62 engines originally developed for the Soviet N-1 vehicle. These engines have been updated by Aerojet with modern avionics and control systems. The baseline Antares second stage propulsion utilizes CASTOR® 30 class solid rocket motor and Orbital's latest Modular Avionics Control Hardware (MACH). The payload fairing is a 3.9 meter diameter composite fairing. Figure 1 illustrates the Antares Space Launch Vehicle (SLV) configurations.

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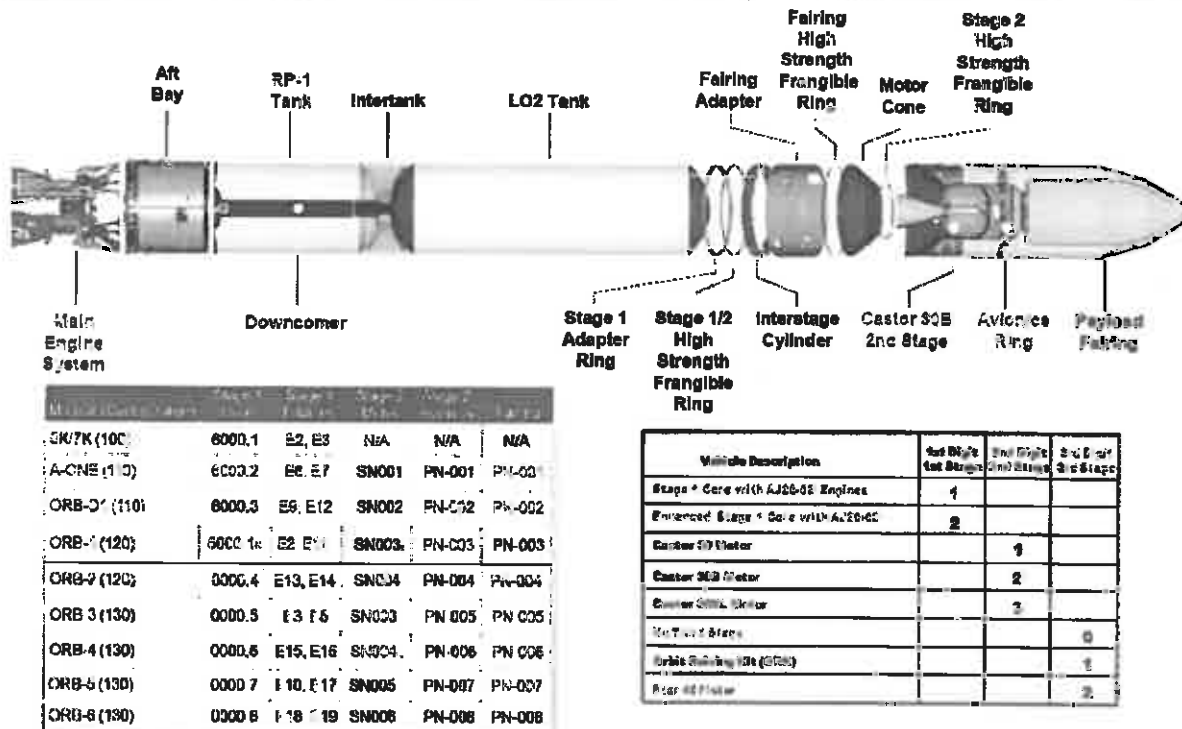


Figure 1. Antares Space Launch Vehicle Illustration (For Reference Only)

The Antares Space launch vehicle will carry the Cygnus spacecraft. The Cygnus spacecraft draws on flight proven technologies and consists of two major components; the Service Module (SM) and the Pressurized Cargo Module (PCM). The Service Module consists of mechanical systems, thermal control, guidance navigation and control, power, propulsion, telemetry command and ranging, command and data handling, and spacecraft flight software. The Pressurized Cargo Module is a 19 m³ pressure vessel and environmental control system for carrying cargo (up to 2,000 kg) to the ISS and provides the berthing system for mating with the ISS. Figure 2 depicts the Cygnus spacecraft configuration.

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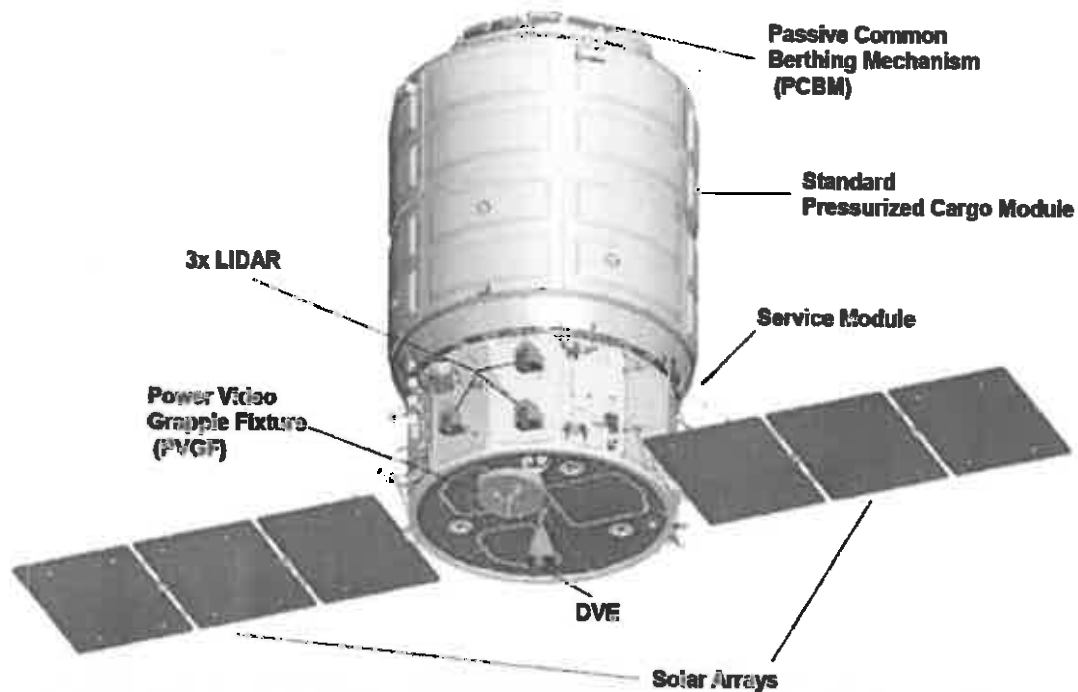


Figure 2. Cygnus Spacecraft Illustration (For Reference Only)

The Cygnus spacecraft is to be inserted into a 51.64° inclination circular orbit with a 210 km x 298 km altitude. The success criteria are associated with the successful completion of the major flight events through payload separation. Figure 3 depicts the major flight events.

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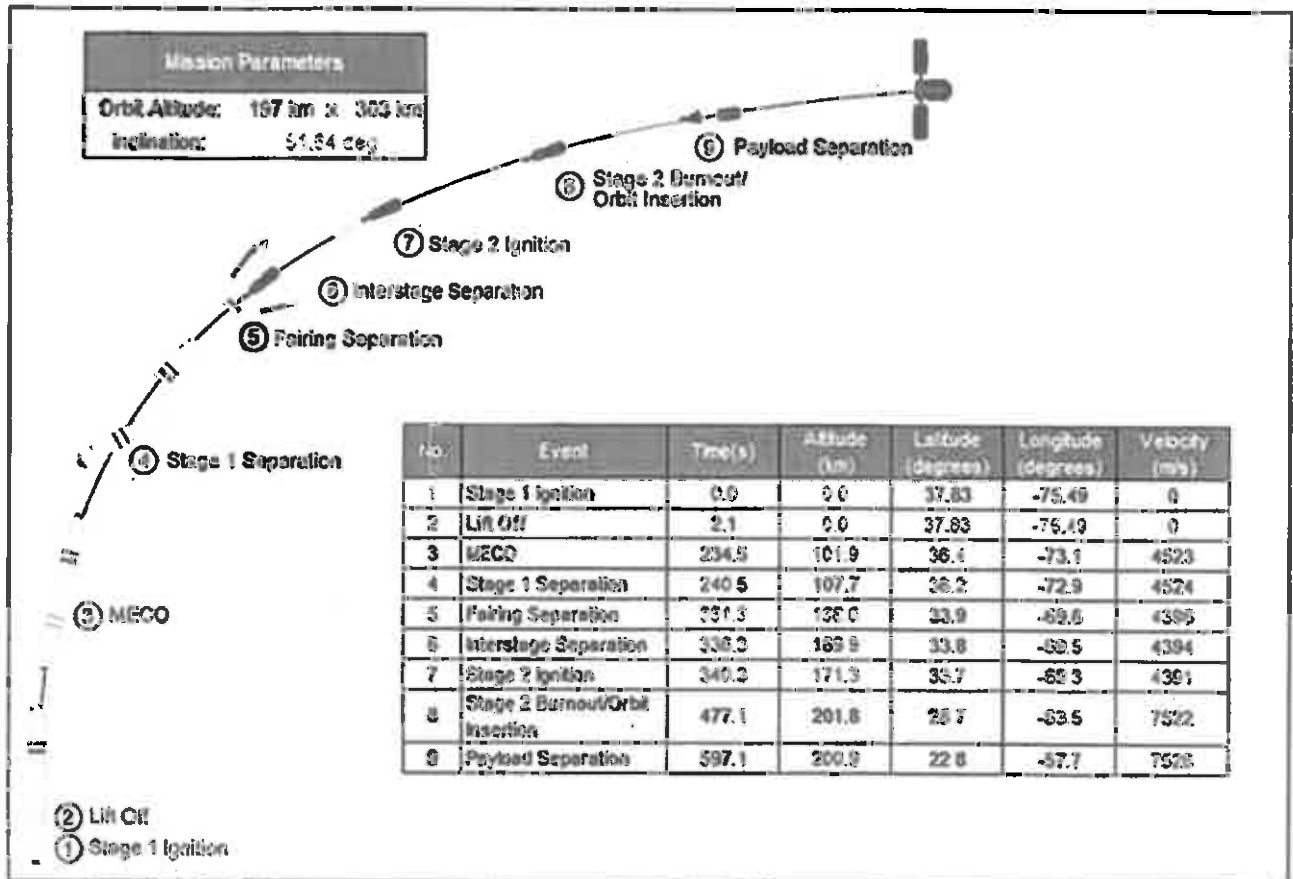


Figure 3. Antares Mission Timeline (For Reference Only)

1.4 PROJECT AUTHORITY, GOVERNANCE STRUCTURE, MANAGEMENT STRUCTURE AND IMPLEMENTATION APPROACH

1.4.1 Project Authority

The Human Exploration and Operations Mission Directorate (HEOMD) Associate Administrator (AA) has full responsibility and authority for the operations and conduct of the Commercial Resupply Services (CRS) Program. Orbital has full responsibility and authority for the operations and conduct of the Antares Program. In addition, Orbital will complete all required agreements, licenses, and documentation to successfully conduct Antares operations. VCSFA has full responsibility and authority for the operations and conduct of the Pad 0A Launch

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Complex. WFF has full responsibility and authority for range services per the Individual Support Annex, approved and on file.

1.4.2 Governance Structure

GSFC/WFF is the lead NASA Center for the range services portion of the Antares mission (covered by this plan) and is responsible for implementation of related aspects of the project. This project shall be governed by the GSFC Program Management Council (PMC) where status shall be reported routinely by GSFC Monthly Status Reviews (MSR). The RMMO is the owner and developer of this plan. The WFF Director, following a briefing on operations, safety, and security issues, and pending the resolution of any open items, will grant authority for the RMMO to proceed with project implementation (not launch).

Problem reporting is accomplished using the WFF Range's existing Range Operations Management System (ROMS) system to report, track, and document discrepancies, lessons learned, and risks. The ROMS database is a baseline Range system that is utilized by all Code 840 managed projects to allow cross-project learning among project managers and the engineering support teams that utilize the range. ROMS can be accessed at <https://roms.wff.nasa.gov/>

Permission for RMMO to proceed will be contingent upon approval by the WFF Director after the completion of all applicable reviews and closure of all action items. The Orbital Program Manager will have final authority to speak for the readiness of the Antares launch vehicle during operations. The VCSFA assigned Operations Manager will have final authority to speak for the readiness of the launch Pad 0A during operations.

The governing oversight of the project is the Director of WFF. In that role, the Director of WFF will:

- Approve the Project Plan.
- Periodically assess the project's technical, cost, and schedule performance.
- Provide support and guidance in resolving technical and programmatic issues and risks.
- Communicate technical performance and risks to the GSFC's Center Director, and provide recommendations for recovery.
- Convene and support independent reviews.

The Chief of the RMMO or their Deputy will:

- Approve the Project Plan.
- Assess the project's technical, cost, and schedule performance on a weekly basis.
- Submit a brief weekly summary of the project's status to WFF senior management.

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- Provide support and guidance in resolving technical and programmatic issues and risks
- Resolve any technical or schedule issues that may arise with other WFF projects.
- Communicate technical performance and risks to the WFF Director and provide recommendations for recovery.

The WFF Range Chief Engineer serves as the Independent Technical Authority for the Range.

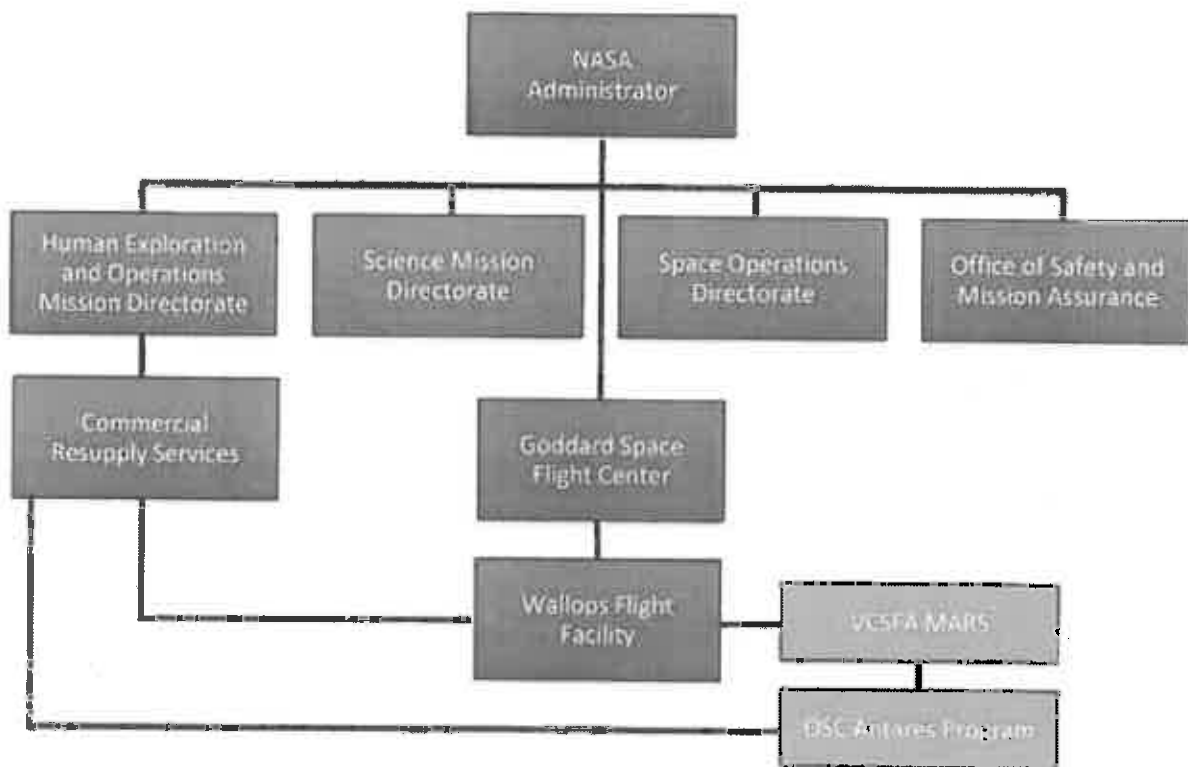


Figure 4. Organizational Alignment

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1.4.3 Management Structure

The WFF Range Support Services Team consists of the following key positions shown in Figure 5.

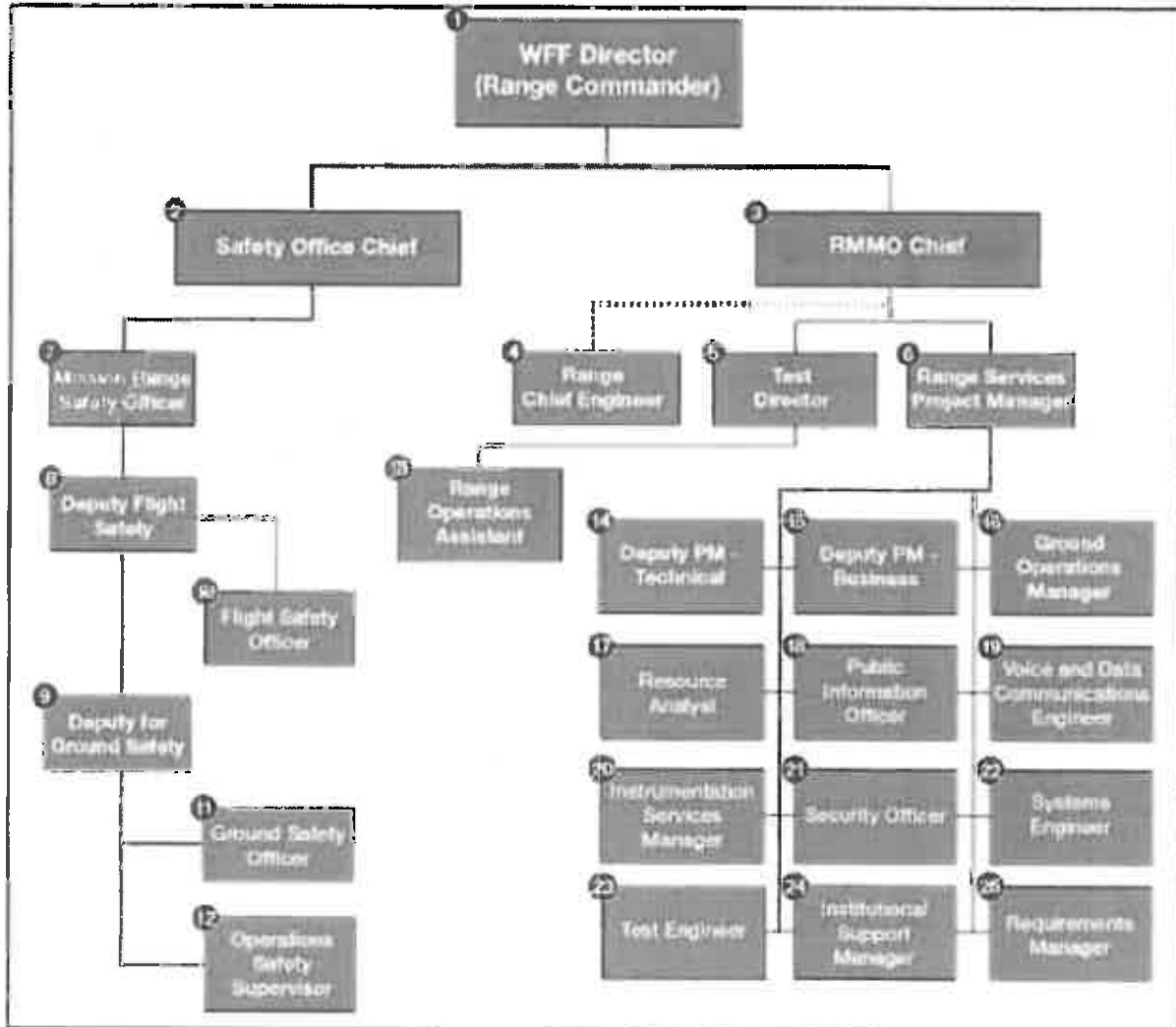


Figure 5. WFF Range Support Services Team

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A short description of the roles and responsibilities of each member of the WFF Range Support Services team is listed below along with an asterisk which identifies positions essential to the accomplishment of this project:

1. *WFF Director (Range Commander)

The WFF Director serves as the Range Commander for all CRS Program activities from WFF. The significant WFF range functions include telemetry, tracking, and command services, facilities engineering, facilities support, and range safety. The WFF Director also provides the strategic vision for WFF to support Antares mission objectives and serves as the primary WFF strategic interface on Antares mission matters to NASA Headquarters, the GSFC Director, CRS Program Leadership, VCSFA, and Orbital. The WFF Director (or his designated representative) is the chair of WFF led reviews for Antares mission, and also serves as the final decision authority approving each Antares launch via an Approval to Proceed (ATP) review. The WFF Director has designated the RMMO as the primary office responsible to manage WFF's support provision of range services.

2. *WFF Safety Office Chief

The WFF Safety Office Chief oversees the organization that is independent of any program, oversees the implementation of safety requirements, and provides safety related services and operational support to programs. The WFF Safety Office Chief appoints the WFF Deputy for Flight Safety and Wallops Deputy for Ground Safety.

3. *WFF RMMO Chief

The WFF RMMO Chief oversees the execution of the range services through the appointment of the WFF Range Services Project Manager. The WFF RMMO Chief represents the Range on issues of policy and grants approval to enter each project operational gate.

4. *WFF Range Chief Engineer

The WFF Range Chief Engineer serves as the principal advisor to the WFF RMMO Chief on matters pertaining to the technical capabilities of the range. The WFF Range Chief Engineer serves as the independent technical authority for the Range.

5. *WFF Test Director (TD)

The WFF TD has authority over all operations conducted on the WFF Launch Range. The WFF TD is responsible for assuring that all range policy, criteria, and external agreements are satisfied during the operation. The WFF TD will provide GO/NO GO for the range to the Orbital Launch Conductor. In obtaining this GO/NO GO, the WFF TD will be supported by the WFF Project Manager and the WFF Range Safety Officer.

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6. **WFF Range Services Project Manager*

The WFF Range Services Project Manager has full responsibility for all range support activities within the scope of the project and is responsible for the safe success of the Antares mission in accordance with NASA procedures, requirements, and directives. Such procedures, requirements and directives take precedence over all contractual and other requirements under which individuals supporting the project may be employed. The CRS Program employs the project management processes as defined in NASA Procedural Requirements (NPR) 7120.5E, NASA Space Flight Program and Project Management Requirements.

7. **Mission Range Safety Officer (MRSO)*

The WFF MRSO is responsible for assuring that WFF safety policy, criteria, and procedures are not violated during operations, and to assure that risks are understood and are within acceptable limits. The WFF RSO has authority to stop work or hold a launch, if necessary. The WFF RSO will keep the WFF TD and WFF Range Services Project Manager apprised of safety status which could affect operations.

8. **WFF Deputy Flight Safety*

The WFF Deputy for Flight Safety oversees the application of safety policies, principles, and techniques to protect the public, workforce, and property from hazards associated with range operations. The WFF Deputy Flight Safety appoints the Flight Safety Officer to the project.

9. **WFF Deputy Ground Safety*

The WFF Deputy Ground Safety oversees the application of safety policies, principles, and techniques to protect the public, workforce, and property from hazards associated with range operations. The WFF Deputy Ground Safety appoints the Ground Safety Officer and Operations Safety Supervisor to the project.

10. **WFF Flight Safety Officer (FSO)*

The WFF FSO is responsible for ensuring the real-time Range Safety Data Display System is GO for launch. The FSO is responsible for making the flight termination decision and executing the appropriate actions based on evaluation of available data. The FSO also has the authority to stop work and hold the launch, if necessary. The FSO assists the WFF MRSO.

11. **WFF Ground Safety Officer (GSO)*

The WFF GSO is responsible for evaluating all aspects of ground safety. The WFF GSO assists the WFF MRSO.

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12. *WFF Operations Safety Supervisor (OSS)

The WFF OSS has authority over all hazardous operations performed during preparation and launch activities at WFF. The WFF OSS or the OSS's designated OSS must be present and shall monitor all procedures involving hazardous operations at WFF. No hazardous procedures will be initiated without his/her knowledge or consent.

13. *WFF Range Operations Assistant (ROA)

The WFF ROA assists the WFF TD in closely monitoring countdown operations and range status. The WFF ROA is responsible for responding to requests for information and making announcements, such as time counts, issuing clearance for radiation, establishing periods of radio frequency (RF) avoidance, establishing roadblocks, and performing station checks.

14. *WFF Deputy Project Manager - Technical (DPMT)

The WFF DPMT is responsible for assisting the WFF Project Manager with the planning, organizing, directing of technical and programmatic aspects of the project. The WFF DPMT acts for the WFF Project Manager on matters within their cognizance and performs as the WFF Project Manager in their absence.

15. *WFF Deputy Project Manager Business (DPMB)

The WFF DPMB is responsible for project business systems control and analysis. The WFF DPMB is responsible for the comprehensive integration of all resources aspects of the project. The WFF DPMB maintains continuous surveillance of schedule milestones for all project systems and all activities, which may affect the programmed costs, technical acceptance, or completion date of the project. The WFF DPMB acts for the WFF Project Manager on matters within their cognizance and performs as the Project Manager in the absence of the WFF Project Manager and the WFF Deputy Project Manager.

16. *WFF Ground Operations Manager

The WFF Ground Operations Manager is responsible for the launch vehicle and payload facility utilization planning and ensures customer facility use requirements are properly integrated into WFF use plans, including processing facilities, hazardous servicing facilities, and special facilities, and storage.

17. *WFF Resources/Financial Analyst

The WFF Resources/Financial Analyst provides financial planning and monitoring for the project.

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18. *WFF Public Information Officer

The WFF Office of Communication's Public Information Officer is responsible for planning and implementing all public affairs activities associated with the project and to coordinate such activities with the VCSFA and Orbital.

19. *WFF Voice and Data Communications Engineer

The WFF Voice and Data Communications Engineer is a member of the WFF Information Technology and Communications Office, Code 763. He/she is responsible for providing data and video communication lines internal to WFF and external to WFF.

20. *WFF Range Services Manager (RSM) for the Range Operations Contract (ROC)

The WFF RSM is responsible for leading the contract range instrumentation team; specifically overseeing requirements review and analysis associated with range instrumentation and operations. The RSM is responsible for scheduling range resources to support project requirements. The RSM keeps metrics and reports status on range instrumentation at MSRs, Monthly Engineering Status Review (MESR), Readiness Reviews, etc. The RISM manages and reports on range instrumentation related risks. The RISM is the authorizing agent for the release of ROC products, including documents and data.

21. *WFF Security Officer

The WFF Security Officer has the responsibility for the protection of people, property, and information assets owned by NASA that covers physical assets, personnel, IT, communications, and operations.

22. *WFF Systems Engineer

The WFF Systems Engineer oversees the project's systems engineering activities as performed by the technical team and directs, communicates, monitors, and coordinates tasks. The WFF Systems Engineer reviews and evaluates the technical aspects of the project to ensure that the systems/subsystems engineering processes are functioning properly.

23. *WFF Test Engineer

The WFF Test Engineer ensures that the range and launch vehicle are compatible, functional and operational for tests.

24. *WFF Institutional Project Support Manager (IPSM)

The designated WFF IPSM is responsible for coordinating, communicating, and providing all institutional support to include, but not limited to, procurement, facilities, logistics, security, and environmental.

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25. *WFF Requirements Manager

The WFF Requirements Manager is responsible for the Requirements Verification Plan and ensuring all requirements have been assigned to a functional area and will track requirements to closure.

1.4.4 Implementation Approach

The WFF Range Services Project Manager's approach for fostering effective upward and downward communication of critical management, technical, risk, and safety information will utilize multiple pathways. The first is to maintain a NASA project folder on a password-protected secure portal containing all important project documents effecting WFF. Anyone who supports the project can request access to the portal via the WFF Range Services Project Manager. In addition, the WFF Range Services Project Manager will conduct status meetings with the WFF project team whenever there is important information to share.

The WFF Range Services Project Manager will respond to any dissenting opinions presented to him from others within WFF. In addition, anyone within WFF can share dissenting opinions with the Chief of RMMO, the WFF Director, or any higher level executive within NASA. If a dissenting opinion pertains to safety, anyone within WFF can also share their opinions with appropriate members of the NASA WFF Safety Office. Unresolved dissenting opinions within the project will be raised to the WFF Director for resolution.

The WFF Range Services Project Manager will communicate to the Chief of RMMO and the WFF Director via a formal weekly status summary. More extensive communications will occur when the WFF Range Services Project Manager participates in project reviews with the WFF Director. These reviews will include discussions of major issues and risks, and whether the WFF Range Services Project Manager is seeking executive help in resolving any of those issues and risks. The WFF Director will also receive direct reports from all independent review boards following each major review.

Specific communications between WFF and non-WFF participants regarding daily mission activities, safety, and risk associated with the project will be enhanced by the use of:

- A project portal website (see internet address on the cover page of this document) hosted by WFF on a secure server where the latest versions of all project documents will be maintained.
- Weekly teleconferences between VCSFA, Orbital and WFF.
- Internal WFF regular team status meetings and various other meetings as required.
- Frequent use of email and teleconferences.
- A project-specific Mission Operations Directive.
- Dress Rehearsal and pre-launch briefings to ensure correct versions of procedures, directives and plans are in use.

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- Monthly WFF-wide status reviews to ensure progress toward key milestones. These will be hosted by WFF Senior management and will include representatives from all WFF organizations.

The WFF Office of Communications will be used to communicate status of events to the public, including pre-launch/launch/post launch information, and will utilize the WFF Office of Communications process but will be contingent on full coordination and pre-approval with Orbital.

Implementation of the CRS Program will be carried out in distinct phases as outlined below for each Antares mission:

- Mission and Logistics Planning Phase
 - Mission Planning Meeting(s)
 - Mission Safety Meeting(s)
 - Generate Project Plan
 - Generate Mission Operations Directives (MOD)
 - Generate Mission Cost Estimates
- Launch Preparation and Launch Phase
 - Suborbital and Special Orbital Projects Directorate (SSOPD) Reviews
 - Range Readiness Review (RRR)

RRR assess all aspects of range support to include; review for completeness of prelaunch, launch, and post launch requirements, planned activities to meet requirements including range instrumentation services plan, safety products, security plans, contingency plans, environmental management plans, logistics plans (personnel and launch vehicle/payload), operation area clearances, Collision Avoidance (COLA), visitor management plan, surveillance plan, Office of Communications plan, mishap plan, special engineering development plans, staffing plans, sparing plans, housing plans, Radio Frequency (RF) management plan, communications plans, test plans, remediation (wrap-up) plan, and proposed schedule.
 - Launch Readiness Review (LRR)

LRR is held to update the mission status, close out actions from the previously held Range Readiness Review (RRR), Mission Readiness Review (MRR) or Flight Readiness Review (FRR), and authorize approval to proceed into launch countdown.

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- **Daily Operations During Launch Preparation and Launch Phase**
 - The MOD will provide the guidelines for daily activities and profiles consistent with the mission goals, cost and schedule.
 - Daily Reports to Suborbital and Special Orbital Projects Directorate.
- **Evaluation/Performance Phase of Range Services**
 - **Mission evaluation occurs throughout the life cycle of the project**
 - **Full and open communications**
 - Project team
 - Orbital team
 - VCSFA team
 - **Control by**
 - Project Plan
 - Configuration Plan
 - Mission Operations Directive
 - Mission Schedule
 - Mission Cost Workbook
 - **Post Mission Brief**
 - Includes inputs from:
 - Customer
 - Team Members
 - Any Participants
 - Lessons learned
 - **Customer Surveys**
 - **Mission Summary Report**

1.5 STAKEHOLDER DEFINITION

WFF's customer for the CRS Program is the VCSFA located at Norfolk, Virginia and Orbital's Antares Program Office located at Dulles, Virginia.

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Mr. Sean Mulligan will represent MARS as the Director of MARS.

Mr. Dale Nash or his representative will represent VCSFA and the various VCSFA stakeholders as the Executive Director of Virginia Commercial Space Flight Authority.

Mr. James Stowers and Mr. Mike Bitzer will represent Orbital and the various Orbital stakeholders as the Mission Manager by providing customer advocacy and concurrence throughout the planning and execution of the Program. This includes the four major groups of activities:

- Formulation
- Approval
- Implementation
- Evaluation

The OSC's Mission Manager is the primary owner of the Program Requirements Document (PRD) which is the specification of required services for which the WFF Range is responsible to deliver. This document forms the basis of all WFF efforts. The OSC Mission Manager is also the primary owner of the Operations Requirements (OR) document for CRS Program.

To ensure customer advocacy, the Orbital's Mission Manager's concurrence will be a required signature on the following project documents:

- NASA Project Plan
- NASA MOD

The Mission Manager, or their representative, will also participate in the following activities:

- Technical Interchange Meetings (TIMs)
- NASA Range Readiness Review (RRR) [Attendance/Representation required]
- NASA Launch Readiness Review (LRR) [Attendance/Representation required]
- Mission Debrief
- Customer Survey
- Other reviews as required.

WFF is the lead NASA Center for the range services portion of CRS Program (covered by this plan) and is responsible for implementation of related aspects of the projects. These projects shall be governed by the GSFC CMC where status shall be reported routinely by Code 800

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MSRs. The WFF RMMO is the owner and developer of this plan. Permission for NASA to proceed with range operations will be approved by the Director of WFF prior to the launch.

Advocacy will be ensured via a close working relationship between the project team and the customer. The customer feedback process will ensure that any positive and/or negative aspects associated with the projects are identified and addressed during or after each project is completed.

The Orbital Program Manager will have final authority to speak for the readiness of the launch vehicle and Cygnus spacecraft during operations.

The WFF RMMO is specifically responsible for:

NASA project management	Telemetry capture
Processing facilities	Communications
Office facilities	Weather forecasting and observations
Range Safety Interface	Security Interface
External agreements with other organizations	Other items as defined in the PRD

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2.0 PROJECT BASELINE

2.1 REQUIREMENTS BASELINE

The detailed requirements are provided and agreed to between WFF and the customer via a formal PRD, Orbital document 1062-0129 which are maintained by the WFF Range Services Project Manager and formally reviewed by representatives from participating WFF organizations. An associated Operational Requirements document, 1062-0127 is derived by Orbital from the PRD and specific to each Antares mission.

Any changes to the success criteria or to project requirements will be submitted as a red-line or revision to mission documentation according to the significance of the change. The new revised documentation will not need new signatures unless range support requirements change. Changes such as launch dates, times and WBS will not require new signatures as part of the revision.

The status of requirements will be tracked using a Requirements Traceability Matrix in the form of an electronic spreadsheet. Requirements will be clearly designated and referenced back to their controlling reference document and section. Each will be assigned to a WFF team member, and the status will be tracked to completion via Action Items closed in weekly status meetings. Requirements will be verified as met using the classic validation method with four levels of criteria: inspection, analysis, testing, and demonstration. Overall results will be communicated and tracked in the MSP.s.

2.2 WORK BREAKDOWN STRUCTURE (WBS) BASELINE

The CRS Program is delineated in a Program WBS. The WFF Range Services Project Manager maintains the project WBS and schedule for each Antares mission.

2.3 SCHEDULE BASELINE

The Antares mission Integrated Master Schedule (IMS) is precedence network (logic based) project level schedule. The schedule includes all major milestones and project reviews and events as well as the necessary detail to provide management visibility into planned activities and current progress. The Range Readiness Review (RRR), Launch Readiness Review (LRR), and Authority to Proceed (ATP) are all related in that each is a gate for its successor. That is, the board of the RRR must, exclusive of actions assigned, indicate to the WFF Range Services Project Manager that the RRR was a "success". This declaration is an inviolable entrance criterion for the LRR. Similarly, a successful LRR, exclusive of actions assigned, serves as a gate for ATP. At the discretion of the WFF Director, the ATP can be conducted immediately following the conclusion of the LRR by completing the appropriate signatures on the ATP form. A basic schedule is shown in Table 1.

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Table 1. Basic Schedule.

<u>Task</u>	<u>Scheduled</u>	<u>Notes</u>
Monthly Status Reviews		Monthly for duration of project
Weekly Status Reviews		Weekly for duration of project
Requirements Review	L - 3 months	
Mission Readiness Review	L - 2 months	
Range Readiness Review	L - 1 month	
Mission Dress Rehearsal (Green Card)	L - 6 days	
Vehicle Rollout to Pad OA	L - 3 days	
Combined Systems Test	L - 2 days	
Launch Readiness Review	L - 1 days	
Authority to Proceed (ATP)	L - 1 day	
Launch	L - 0 day	
Quick Look Report	L + 5 days	
Final Post Flight Report and Closeout (Lessons Learned, etc.)	L + 30 days	

2.4 RESOURCE

2.4.1 Funding Requirements

Antares mission estimate is based on each project WBS and funded per the mission specific Individual Support Annex.

Costs are estimated by a grass-roots assessment by each responsible organization over the lifecycle of the Project. In some instances procurement support is a direct quote.

2.4.2 Workforce Requirements

All personnel cost estimates are based on averages for official Center sanctioned rates. The estimates include only labor, travel, and procurements.

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2.4.3 Infrastructural Requirements

A detailed analysis of facilities requirements was made, based on the Project WBS, budget limits, schedule, and deliverables. The CRS Program will utilize WFF institutional support in the following:

- Building H-100 Payload Processing Facility (PPF)
- Building V-55 Spacecraft Fueling Facility (SFF)
- Building X-79 Horizontal Integration Facility (HIF)
- Building W-20 Blockhouse 3
- Building X-75 (data communications hub)
- Building X-15
- Launch Pad 0A
- Building E-106A (Range Control Center)
- Building E-100 Breakout Room for Foreign National Control Center
- Building Y-45 Ordnance Storage
- Building Z-40 Project Support Facility
- Utility resources including island and mainland generators for launch countdown.

2.5 JOINT COST AND SCHEDULE CONFIDENCE LEVEL

The Joint Confidence Level (JCL) analysis is required to assert that the project has an executable plan. The project cost, schedule, and technical content management baseline has been established at the 70 percent confidence level. A 70 percent confidence level is the point on the joint cost and schedule probability distribution where there is a 70 percent probability that the program or project will be completed at or lower than the estimated amount and at or before the projected schedule.

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3.0 PROJECT CONTROL PLANS

3.1 TECHNICAL, SCHEDULE, AND COST CONTROL PLAN

The most current Antares mission will establish the baselines in terms of schedule, budget, and technical performance for the upcoming project. If projected schedule and cost performance exceeds the baseline by 10 percent the Range Services Project Manager shall report the variance to the RMMO Chief and this information shall be presented to VCSFA and Orbital. In addition:

- o Earned Value Management will not be used for this project.
- o The project will not proceed to the next milestone until closure of actions at required reviews.
- o Section 2.3 addresses the projects process for monitoring and controlling the IMS.
- o Section 1.4.3 addresses dissenting opinion.
- o Technical schedule and cost status is reported during the MSRs.

3.2 SAFETY AND MISSION ASSURANCE PLAN

The safety program development and implementation for the CRS projects are fully covered by NASA, GSFC, and WFF procedures and guidelines. Safety documentation will be prepared at WFF and reviewed by Orbital and VCSFA. On-site safety support will be provided by WFF representatives for both ground and flight safety. Problem reporting is covered in Section 1.4.2 of this project plan. Orbital is entirely responsible for the mission assurance for the Antares launch vehicle and Cygnus Spacecraft which is addressed in Orbital's *Mission Assurance Plan for Antares (TM-20609)*.

WFF is responsible for all safety issues related to operations conducted at WFF. Mission safety is divided into two organizational responsibilities; ground and flight safety. These programs cover the mission lifecycle from design, development, and assembly, to flight preparation, launch, and termination. The WFF Range Safety Operations Process 803-PG-8715.1.1 provides an overview of the range safety process.

The WFF MOD, with various safety appendices, are the overriding safety documents for the project.

The Ground Safety Team will identify and document the hazardous systems and system safeties, and define the WFF safety category for each hazardous system. Also, the Ground Safety Officer is responsible for determining, coordinating, and managing all roadblocks, pre-launch, and launch danger areas. The WFF Ground Safety Process 803-PG-8715.1.13 provides an overview of the ground safety process.

The Flight Safety Team will establish operational hazard areas. The Flight Safety Officer, in conjunction with the TD, will coordinate and plan all air and sea surveillance activities. The WFF Flight Safety Process 803-PG-8715.1.12 provides an overview of the flight safety process.

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In addition to the Risk Analysis Report (RAR) documentation, WFF will provide Ground and Flight Safety Plans for the Antares missions. A Ground Safety Plan will be completed and will address launch pad procedures, restrictions and hazards. The Flight Safety Plan will address trajectory goals and limitations.

WFF will prepare RAR and will be submitted for review and approval. These RARs will establish the safety program to be employed during various phases of the project. RARs will describe the hazards involved during pre-launch and launch, document the safety criteria and preventative measures, and establish a risk level to be accepted by WFF. RARs cover both ground and flight safety issues from an overall project perspective.

A WFF Range Safety Officer is an integral part of the core project team and maintains safety program responsibility. All safety aspects of each project will be coordinated with both the WFF PM and Project (Orbital and VCSFA).

3.3 RISK MANAGEMENT PLAN

The purpose of risk management is to identify risks and threats early in the project so that appropriate mitigation plans may be developed and implemented to reduce the consequences of the risk or likelihood that the risk will occur. This Continuous Risk Management (CRM) process provides systematic methods for identifying, analyzing, planning, tracking, controlling, communicating, and documenting risks on a continuous basis.

The strategy of the CRS Program for managing risk is to:

- Embed risk management processes into normal day-to-day activities to identify and help manage all risks and potential threats.
- Delegate risk-management responsibility to the lowest possible organization with the allocated resources to mitigate or authority to accept the risk.
- Present project risks to the GSFC Program Management Council, which is chaired by the GSFC Center Director, assists in the management of project risks and meets monthly.
- Utilize Mishap Preparedness and Contingency Plan for Commercial Crew & Cargo Program Office (MPCP: C3P-0002) as required.
- A stand-alone Risk Management Plan will not be utilized on these projects as project risks are presented in Monthly Status Reviews.

All project personnel are responsible for performing the following functions for managing a risk, reflecting the NASA CRM paradigm:

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Identify: Identify risks (technical and programmatic) specific to the project.

- Arrive at a concise description of the risk, identifying the risks and clearly describing the risks in terms of both the undesirable event the risk presents as well as the consequences of that event to the project.

Analyze: Evaluate and prioritize risks based on the CRM Process.

- Classify and group risks to help to understand them.
- Assess probability and consequences of occurrence (cost, schedule, performance and safety) and score using the risk matrix.
- Prioritize the risks based on the above-defined criteria.
- When allocating resources, prioritize to determine which risks should be dealt with first.

Plan: Develop an action plan and allocate resources based on prioritization of risks

- Assign responsibility.
- Determine the approach to use (research, accept, watch or mitigate) for each risk.
- Define scope and action plan.

Track: Monitor and track risk attributes and mitigation plans

- Monitor and mitigate risks as related data are acquired, compiled, analyzed, and reported.
- Use reports to communicate information (quantitative and/or qualitative) required for effective control decisions.
- Utilize appropriate and meaningful metrics and decision points for tracking risks.

Control: Make decisions based on the data presented in the tracking reports. This insures that the risk is continually and effectively managed.

- Decisions are based on current information as well as experience and must respond to changing conditions.
- Risk decisions and control mechanisms should be integrated with standard project management practices.
- Utilize tracking data and trends to determine how to proceed with risks (close, continue tracking and executing the current plan, re-plan, accept the risk, or invoke a contingency plan).

Communication and Documentation: Provide information and feedback to the project on risk posture, activities, risk status, and new potential risks.

- Ensures the visibility of risk information for better management.

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- Document all risk information at all stages of the process utilizing a Risk Exposure Matrix chart as shown in Figure 6.

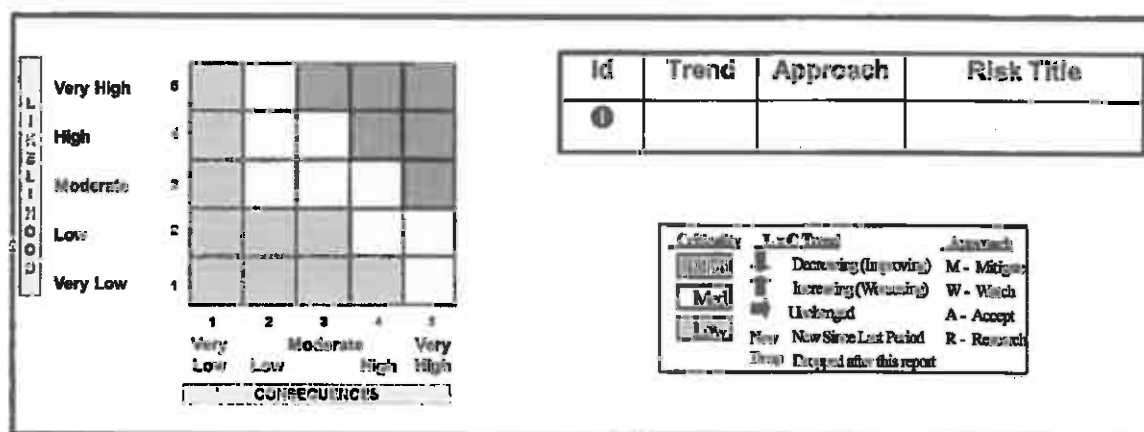


Figure 6. Risk Exposure Matrix

3.4 ACQUISITION PLAN

The success of the Antares missions relies on effectively managing several dependencies. Agreements have been established between WFF, other NASA Centers, and other US and international organizations. These include:

- The temporary tracking station for telemetry, radar, and commanding at Coopers Island, Bermuda.
- The Virginia Capes Operating Area (VACAPES) operational areas will be cleared with the US Navy.
- The Federal Aviation Administration (FAA) operational airspace will be identical to that used for all space launches from WFF.
- Collision Avoidance (COLA) guidance from the USAF will be identical to that used for all space launches from WFF.
- Assistance from the U.S. Coast Guard and the Virginia Marine Police in clearing surface vessels from the launch hazard area.
- The NASA JSC Commercial Orbital Transportation Services office assists in providing independent expertise from within NASA centers to help resolve problems and issues and to provide lessons learned from other NASA programs.

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The following major support service contracts support the Antares missions:

Contract Number: NNG10WA14C

Contractor: LJT & Associates

Description of Service: Provides range operations support service to WFF Research Range Services Program including personnel, equipment, tools, materials, and supervision.

Contract Number: NNG14WA44C

Contractor: LJT & Associates

Description of Service: Provides support service for the institutional management and operation of WFF.

Contract Number: NNG09WA08C

Contractor: Virginia Commercial Space Flight Authority

Description of Service: Provides critical support capabilities for launch of orbital and suborbital space hardware from WFF to include studies, mission planning, and launch specialized service.

Contract Number: NNG13WA41D

Contractor: Computer Sciences Corporation

Description of Service: Provides engineering support service to WFF.

Contract Number: NNM11AA04C

Contractor: NICS

Description of Service: Provides maintenance and operations of the interconnect telecommunication systems to WFF.

Contract Number: NNG12WA38C

Contractor: Millennium Engineering and Integration Company

Description of Service: Provides flight, ground, and institutional safety support to WFF.

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3.5 TECHNOLOGY DEVELOPMENT PLAN

WFF is not responsible for any new technology insertions for these projects.

3.6 SYSTEMS ENGINEERING MANAGEMENT PLAN

This Project has no system development requirements and therefore does not require a systems engineering plan. The scope of the systems engineering is limited to requirements tracking and the approach to be implemented on the project will involve WFF Applied Engineering and Technology Directorate (AETD), who will provide the necessary systems and configuration engineering support for the Range services portion of CRS projects. This will include providing a Systems Engineer to oversee all technical aspects of test planning and execution. During this time, they will functionally report to the WFF Range Services Project Manager.

3.7 INFORMATION TECHNOLOGY PLAN

IT requirements will be met by using existing IT services. A representative from WFF Information Technology & Communications Branch (Code 763) will be provided to coordinate delivery of these IT services. New systems or modifications to existing systems will be handled by each system owner's organization. All of the Range Services IT systems that will be used to support these projects are included in the Wallops Range Instrumentation Systems (WRIS) security plan, CD-840-H-GSF-8401, with a current authorization to operate signed by the appropriate system owner.

3.8 SOFTWARE MANAGEMENT PLAN

All WFF software utilized by WFF for operational support the CRS projects is part of the Research Range Services Program and is existing software covered by that program's management plans.

3.9 VERIFICATION AND VALIDATION PLAN

All vehicle communication and support systems will be tested prior to launch.

3.10 REVIEW PLAN

Review team members and review content are identified, selected and approved by the Chair of the individual review or his designee. Review team action items are reported to the WFF Range Services Project Manager, the RMMO Chief, and the Safety Office Chief, all of whom must certify disposition of findings prior to requesting operational approval. In addition, the project team will support customer reviews as requested by the customer for the purpose of providing status or issues relating to range preparations and readiness. Table 2 summarizes the anticipated Review requirements.

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Table 2. Review Requirements.

Review	Purpose	Chair	Criteria
Center Monthly Status Review	Overall progress and high level insight on status, issues, risks, schedule, cost	Center Director, GSFC	MSR Package reviewed by RMMO Chief
WFF Monthly Status Review	Overall progress and high level insight on status, issues, risks, schedule, cost	Director, WFF	MSR Package reviewed by RMMO Chief
Range Readiness Review	Assess all aspects of range support planned for the mission, including work schedules.	Chief, RMMO	Project plan, MOD, Safety plans, Operational procedures for ground operations, Mishap plan, Contingency plan, Hurricane plan, Security plan, Visitor management plan, Instrument support plan, RF control plan, Public Affairs and Guest plan
Launch Readiness Review	Updates the project status, close out actions from the previously held Range Readiness Review, Mission Readiness Review, Flight Readiness Review and authorize approval to proceed into launch countdown,	Director, WFF	RRR Closure, FRR Closure, MRR Closure
Approval to Proceed	Provide final approval for WFF support and launch operations	Director, WFF	LRR Closure

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3.11 MISSION OPERATIONS PLAN

Details of each mission will be written in the Mission Operations Directive (MOD) specific to that mission. Signatures will be required for each MOD.

3.12 ENVIROMENTAL MANAGEMENT PLAN

Potential impacts to the environment from actions associated with CRS projects were previously analyzed and documented in the 2009 Environmental Assessment for the Expansion of the WFF Launch Range. This analysis leads to determination of a Finding of No Significant Impact.

3.13 INTEGRATED LOGISTICS SUPPORT PLAN

The WFF Management Operations Directorate (Code 200) Institutional Project Support Manager (IPSM) will coordinate with internal and external team members to address general CRS project logistical requirements. Logistics for the ROC instrumentation equipment is the responsibility of the ROC logistics office at WFF.

3.14 SCIENCE DATA MANAGEMENT PLAN

No scientific data will be generated or captured by the Antares missions.

3.15 INTEGRATION PLAN

Orbital is responsible to bring the elements together to assemble each subsystem and to bring all of the subsystems together to assemble the launch vehicle and payload. The WFF Range Services Project Manager is responsible to provide the necessary range support assets for integration, and for the coordination of meetings, documents, and planning to execute the CRS project.

3.16 CONFIGURATION MANAGEMENT

The WFF Range Services Project Manager is responsible for ensuring that each Project performs the configuration control functions necessary to meet the requirements of NASA NPR 7123.1. The WFF Range Services Project Manager will designate Project Review Boards (PRBs) at the appropriate levels within the Project as well as associated Configuration Management (CM) personnel to ensure the implementation of the Project configuration control activities.

This project plan is under change control as mandated by GPR 1410.2, Configuration Management. Any non-administrative changes will be implemented by the WFF Range Services Project Manager, concurred to by all signatories on the cover page and described and recorded in the change record sheet within this document as well as a revision identifier assigned.

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Records developed for this project are delivered to the ROC Configuration Manager to be documented in CMStat. These records will be submitted at each review or designated development gateway as indicated in the project schedule.

All documents under configuration control will have a cover sheet that consists, at a minimum, of the document title, name and responsible organization, an approval and/or effective date, a document control number, and a revision level, if applicable. Documents contain a notice in the footer stating:

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3.17 SECURITY PLAN

There are no classified security requirements for the CRS Program therefore a security plan is not required. However, the Range team located at WFF and all subcontractors will comply with Government requirements for industrial, physical, personnel, counterintelligence, counterterrorism, and information/information technology security and asset protection during all project phases and at all locations where project work is performed, including contractor's and subcontractor's facilities, during transportation, while at the launch site and associated processing facilities. WFF and their support contractors are responsible for security training and refresher briefings to all civil servant and support contractor personnel working on the Project.

Access to all areas in which flight hardware, software, technical data, IT facilities, operations areas, and operations products reside will be limited to personnel working the project and cleared per project and/or contractor requirements. Foreign National access to project information or facilities will require the approval of the WFF Chief of Security, per NASA requirements.

For emergency response requirements Antares missions will also be using 803-PLAN-0003, Emergency Operations Plan for WFF.

3.18 PROJECT PROTECTION PLAN

To date, WFF has not been the target for protests and does not see that changing.

3.19 TECHNOLOGY TRANSFER CONTROL PLAN

Export control requirements are not applicable.

3.20 LESSONS LEARNED PLAN

WFF utilizes the Range Operations Management System's Lessons Learned Library which is located at <https://roms.wff.nasa.gov/>. CRS projects will utilize the existing ROMS Lessons

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Learned database for knowledge capture, tracking, and review of lessons learned and communication. The WFF Project Manager and project team will review past lessons learned during range operations at WFF and will apply lessons as appropriate.

3.21 HUMAN RATING CERTIFICATION PACKAGE

The Antares missions are not human space flights. A human rating certification package is not applicable.

3.22 PLANETARY PROTECTION PLAN

The Antares missions do not require planetary project activities.

3.23 NUCLEAR SAFETY LAUNCH APPROVAL PLAN

Radioactive materials are not associated with the Antares missions; a nuclear safety launch approval plan is not required.

3.24 RANGE FLIGHT SAFETY RISK MANAGEMENT PROCESS DOCUMENTATION

The NASA NPR 8715.5, Range Flight Safety Program, is applied by the Wallops Flight Safety Group, within the Wallops Safety Office, to produce Flight Safety Plans which will establish operational hazard areas, flight safety limits, and launch criteria for the Antares missions launch operations. The Flight Safety Plan will document restrictions and limitations' being implemented to ensure the launch/flight is conducted safely.

3.25 EXPENDABLE LAUNCH VEHICLE PAYLOAD SAFETY PROCESS DELIVERABLES

The launch vehicle payload is not managed by WFF.

3.26 EDUCATION PLAN

The WFF Educational activities for the Antares missions will support the following NASA strategic goals:

NASA's Education Vision Statement: *To advance high quality Science, Technology, Engineering, and Mathematics (STEM) education using NASA's unique capabilities*

Strategic Plan Goal 5: *Enable program and institutional capabilities to conduct NASA's aeronautic and space activities.*

Outcome 5.1: *Identify, cultivate, and sustain a diverse workforce and inclusive work environment that is needed to conduct NASA missions*

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Strategic Plan Goal 6: *Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contribute to a strong national economy.*

Outcome 6.1: *Improve retention of students in STEM disciplines by providing opportunities and activities along the full length of the education pipeline.*

Outcome 6.2: *Promote STEM literacy through strategic partnerships with formal and informal organizations.*

Outcome 6.3: *Engage the public in NASA's missions by providing new pathways for participation.*

Outcome 6.4: *Inform, engage, and inspire the public by sharing NASA's missions, challenges, and results.*

The WFF Educational planned activities for the CRS Program to enhance STEM include:

Plan and implement an Education Day that will include information on the purpose and processes for Antares mission and its subsequent resupply mission to the International Space Station.

- o Guests will be invited to the briefing, discussions on how to recruit and retain students in STEM courses and majors, and view the launch.
- o Participants will include regional representatives from school district K-12 administration and STEM coordinators or coaches, Maryland STEM Network leaders, community college and university administrators and lead faculty.

The CRS Program Education Day will support two of NASA's Education lines of business:

- **Institutional Engagement:**
 - o Support efforts that build and develop capacity for sustained STEM capabilities in topical areas of interest to NASA.
 - o Includes collaboration with organizations that enable others to accomplish STEM and develop an interest in STEM.
 - o Enable STEM institutions and organizations to strengthen their capacity to perform STEM research and development aligned with NASA.
 - o Enhance their curriculum and programming.
 - o Deliver content based in NASA's mission.
- **Educator Professional Development (EPD):**
 - o **Community-Requested EPD:** The purpose of Community-Requested EPD is to provide Centers appropriate levels of flexibility to meet and respond to the educator professional

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development needs of their surrounding communities, on a case-by-case basis throughout the year, utilizing a set of uniform guidelines. These opportunities would enable Centers to act as service providers of their communities to assist educators on a regional level (e.g. local schools/districts, State Departments of Education, universities, museums, etc.).

- o This Community-Requested EPD will help guide and assist educators within WFF regional communities with appropriate and relevant NASA STEM content for developing high quality STEM EPD plans submitted for a variety of purposes e.g. district and state level Race to the Top, Title I School Improvement, federal and state financial assistance, Next Generation Science / Common Core Standards, 21st Century Skills, etc.

The WFF Educational activities for the CRS Program will utilize the following Metrics and Evaluation:

- The participants will complete the standard Office of Education Performance Measurement (OEPM) evaluation form at the conclusion of the event and will also describe how they will utilize the information and resources that were provided.

3.27 COMMUNICATIONS PLAN

The WFF Office of Communication activities for the CRS Program are as follows:

3.27.1 Pre-launch

General:

The WFF Office of Communications will serve as the host/lead organization for all public information programs at WFF in collaboration and close coordination with participating organizations. The WFF Office of Communications will coordinate on all official public, media, and guest operations requirements with range users.

Release of Information:

To support area clearance needs and public safety requirements, at minimum, basic information to include launch date and window will be released by WFF for all range operations generating public interest. Additional guidance on the release of information is offered below:

- Launch vehicle: The owning organization is the lead for nominal operations. In the event of an anomaly where the range sends a command destruct signal, NASA will collaborate with the launch vehicle owner in developing public statements related to the anomaly.
- Launch pad: Owning organization will respond to pad-related queries. In the event of an anomaly on the pad requiring a NASA emergency services response, NASA, in coordination with the pad owners, will lead public information efforts related to the immediate response.
- Payload: All payload questions will be referred to the payload owner.
- Launch services: NASA will field launch service questions related to range support.

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- **NASA policy:** NASA policy questions will be referred to NASA Headquarters.

Range Readiness Review:

The WFF Office of Communications will collaborate with the WFF Project Manager on communication activities related to launch and range operations. At the Project Manager's request, the Office of Communications will brief planned communications activities (re: media viewing, guest operations) during range readiness reviews.

Media Accreditation:

The WFF Office of Communications will accredit all media. International media must submit name, country of birth, and passport number (and additional information as required by security) at least 20 days prior to a scheduled media event. U.S. media must submit requests for accreditation 7 days prior to a scheduled media event. For Expendable Launch Vehicle (ELV) launches, the Office of Communications will issue an advisory one month in advance of the scheduled launch date to announce accreditation open for international media.

Media Advisory:

The WFF Office of Communications will develop a media advisory in close coordination with all mission partners announcing pre-launch media opportunities (scheduled press conferences), remote-camera set-up meet-up times, any pre-launch photo opportunities, launch viewing details and logistics, and scheduled post-launch media opportunities.

Call-in Launch Line:

The public call-in line (757-824-2050) will be updated with scheduled launch date and window for all launches from WFF.

Media Viewing Site:

Viewing sites vary depending on the launch vehicle and size of the hazard area. For ELV launches, a small group of media may view and record the launch and listen to countdown net from the parking lot of Building U-70. For media groups with more than 20 media outlets, a viewing site with countdown net is available on a hill off of Mainland Road pulling back about 150 yards from U-70. Media will be accredited and under escort while covering launch activities at WFF.

Remote camera set-up:

The pad and launch vehicle owners may establish a remote camera set-up location. The Project Manager will facilitate remote camera set-up by leading a media escort, in coordination with mission partners, to the remote camera set-up site. Set-up is typically scheduled L-1 day before launch.

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Pre-Launch News Conference:

The WFF Office of Communications will support pre-launch news conferences as required for launch operations. A senior WFF range manager is available to support a pre-launch news briefing by speaking to range operations, to include area clearance and weather. The WFF Visitors Center auditorium is available and ideal for supporting press conferences, including those going live to NASA TV.

Live Broadcast:

The range user may require a live broadcast (via web, NASA TV, or both) of launch operations. The WFF Television Control Room is capable of supporting high-definition web and television live broadcasts. The WFF Office of Communications will coordinate on and support all live broadcast requirements (the range user will pay reimbursable expenses, e.g. overtime labor costs, travel costs for personnel to support launch live broadcasts).

Social Media engagement:

The WFF Office of Communications will actively engage in social media updates during all launch operations to include updating the public on launch dates/times, details of the count, launch scrub information, etc. Social media interaction may vary depending on the nature/classification of the range mission. The WFF Web Operations Chief will serve as the primary point of contact for coordinating NASA Social requests.

Guest Operations:

- While restrictions may be imposed based on launch vehicle size and environmental conditions day of launch, the area outside of Building U-40 is an acceptable viewing location. The following guidelines apply:
- WFF will identify a single overall point of contact for guest operations who will work in coordination with the GSFC Guest Operations chief; a volunteer pool will be recruited among WFF employees
- The range user/customer will cover costs associated with guest operations (e.g. buses, tents, bleachers)
- WFF Guest Ops will "badge" all guests using a pre-approved badge layout and design coordinated with and agreed upon by security
- Guests will travel to the viewing site on buses to minimize traffic/congestion
- A WFF Guest Ops escort will accompany each bus traveling to the mainland. The escort, while serving as a NASA representative, will also assume command and control if a safety/security issues arises
- All those viewing (media/guests/employees) will receive a safety briefing

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- Permission must be granted by the Range/Safety before guests are allowed to proceed to the mainland viewing area. If conditions exist that preclude mainland viewing, the alternate viewing site will be the WFF Visitors Center
- The WFF-specific VIP list should be tied in with the program/range user-VIP list; this will create unity of effort when conducting guest ops
- In the event invited guests exceeds the allowable limits, the overflow viewing location is the WFF Visitors Center
- No pets are allowed at the mainland viewing area; children 10 and older only; children under 10 may view from the Visitors Center with parent/guardian
- WFF Leadership/Guest Ops will make the final determination who has access to the second floor viewing area of U-40, typically reserved for high-level VIP guests (e.g. NASA administrator). The second floor viewing area can accommodate about 20 personnel, but may not be available depending on mission requirements

Support to Education:

The WFF Office of Communications will collaborate with the Education Program Office on education-related activities. Support may include establishing a separate viewing site for education activities or providing media training, briefing materials, and/or fact sheets related to the current mission.

Public Viewing:

The official public viewing location for launch operations is the WFF Visitors Center. The Visitors Center will open prior to the opening of the launch window; countdown net is available on-site. In collaboration with the National Park and Fish and Wildlife Services, Assateague Island may also be used as a public viewing site. The Office of Communications will recruit volunteer NASA docents to engage the public at viewing locations.

Photo/Video requirements:

Photo/Video requirements for use in public information programs will vary depending on the mission and range customer. Generally speaking, requirements will often include access to unclassified range camera feeds for use during live broadcasts and access to range launch photos and video (cleared for release through the range customer and NASA) for use in developing media releases, post-launch web features, social media engagement, etc. The Office of Communications will provide unclassified photo and video from media and/or public viewing locations for immediate release via web and social media outlets.

Additional support as required:

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As missions dictate, the WFF Office of Communications may collaborate and coordinate with other centers and organizations (e.g. Strategic Communications) on outreach efforts conducted in advance of and following launch operations.

3.27.2 Post-launch

News Release:

The WFF Office of Communications and mission partners will coordinate/distribute a post-launch news release to media outlets, higher headquarters, and other interested parties via e-mail, the web, and social media outlets. Timing of the post-launch release will be discussed and agreed upon by NASA and participating organizations with consideration given to key milestones such as range safety end of mission, spacecraft separation, and payload recovery.

Photo/Video:

Unclassified photos/video from public and/or media viewing sites will be distributed as soon as possible following a successful launch operation. The WFF Office of Communications will work closely with the Range Optics section and the range customer in acquiring, clearing, and releasing launch video and photos to the media and public.

Call-in Launch Line:

The call-in launch line will be updated immediate after the post-launch news release has been distributed to media outlets.

News Conference:

The WFF Office of Communications will support a post-launch news conference as required; a senior WFF manager is available to support a post-launch news briefing. The WFF Visitors Center auditorium is available and ideal for supporting press conferences, including those going live to NASA TV.

Remote Camera Pick-up:

Upon PM and OSS approval, the WFF Office of Communications will escort media photographers to the launch pad to pick-up remote media cameras (typically no-later-than (NLT) L+1 hour). WFF will coordinate with the launch pad owner, range customer, and the range on access to the pad. Safety considerations take precedent.

Evaluation/After-Action Report:

The WFF Office of Communication will conduct a media analysis and develop a post-launch after-action report no later than one week after launch operations. Lessons learned will be incorporated into this plan and all future WFF Office of Communications operations.

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Contingency:

Safety for the public, guests, and media is the immediate driving factor during an on-site contingency situation (e.g. pad explosion, flight termination immediately after lift-off) and all communications activities should be initially focused on aiding the immediate emergency response. A constant, free-flow of information without speculation will continue throughout the contingency event. Potential scenarios and relevant courses of action follow:

- **Pad explosion:** The WFF Office of Communications, in coordination with NASA Headquarters, VCSFA, and the launch vehicle owner, will take the lead in the release of information pertaining to the immediate emergency response. A contingency news release will be issued no later than anomaly + 1 hour. A post-anomaly press conference should be conducted no later than anomaly + 3 hours; spokespeople may include the incident commander, WFF Director, and the pad owner.
- **Flight termination:** The WFF Office of Communications, in coordination with NASA Headquarters and the launch vehicle owner, will take the lead in the release of information pertaining to a flight termination. A contingency news release will be issued no later than anomaly + 1 hour. A post-anomaly press conference should be conducted no later than anomaly + 3 hours; spokespeople may include the range chief, range safety, and the launch vehicle owner.
- **Launch vehicle failure:** The launch vehicle owner, in coordination with NASA and the payload owner, will take the lead in the release of information related to a launch vehicle failure (downrange, no flight termination). If a NASA payload is involved, a contingency news release will be issued no later than anomaly + 1 hour. A post-anomaly press conference should be conducted no later than anomaly + 3 hours. If a non-NASA payload is involved, NASA will support the range customer as necessary/required.
- **Spacecraft failure:** The payload owner will lead the release of information related to spacecraft failures.

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4.0 WAIVERS OR DEVIATIONS LOG

The project submits requests for deviations and waivers related to safety to the WFF Director for review and approval. Deviations and waivers related to engineering are approved by the AETD. All deviations and waivers are stored and status maintained at <https://roms.wff.nasa.gov/>.

5.0 CHANGE RECORD SHEET

All changes to the Project Plan will be reflected in the Change Record Sheet located at the beginning of this document, and will also be tracked and logged into the Antares Configuration Management (CM) Listing and Change Record Sheet.

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6.0 APPENDICIES

Appendix A Acronyms

AA	Associate Administrator
AETD	Applied Engineering and Technology Directorate
ATK	Alliant Techsystems
ATP	Approval to Proceed
CM	Configuration Management
COLA	Collision Avoidance
CP	Commercial Partners
CRM	Continuous Risk Management
CRS	Commercial Resupply Services
DPMB	Deputy Project Manager - Business
DPMT	Deputy Project Manager – Technical
ECS	Environmental Control System
EPD	Educator Professional Development
FAA	Federal Aviation Administration
FRR	Flight Readiness Review
FSO	Flight Safety Officer
GSFC	Goddard Space Flight Center
GSO	Ground Safety Officer
HEOMD	Human Exploration and Operations Mission Directorate
HIF	Horizontal Integration Facility
IMS	Integrated Master Schedule
IPSM	Institutional Project Support Manager
ISS	International Space Station
IT	Information Technology
JCL	Joint Confidence Level
JSC	Johnson Space Center
LCC	Launch Control Center
LFF	Liquid Fueling Facility
LM	Launch Mount
LOX	Liquid Oxygen
LRR	Launch Readiness Review
LWO	Launch Weather Officer
MACH	Modular Avionics Control Hardware
MARS	Mid-Atlantic Regional Spaceport

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MCC	Mission Control Center
MCLF	Medium Class Launch Facility
MESR	Monthly Engineering Status Review
MOD	Mission Operations Directive
MRR	Mission Readiness Review
MSR	Monthly Status Review
NASA	National Aeronautics and Space Administration
NLT	No Later Than
OEPM	Office of Education Performance Measurement
OSC	Orbital Sciences Corporation (Orbital)
OSS	Operations Safety Supervisor
PM	Project Manager
PMC	Program Management Council
PPF	Payload Processing Facility
PRB	Project Review Board
PRD	Program Requirements Document
RAR	Risk Analysis Report
RCC	Range Control Center
RF	Radio Frequency
RMMO	Range and Mission Management Office
ROA	Range Operations Assistant
ROC	Range Operations Contract
ROMS	Range Operations Management System
RRR	Range Readiness Review
RISM	Range Instrumentation Services Manager
RSO	Range Safety Officer
SLV	Space Launch Vehicle
SSOPD	Suborbital and Special Orbital Projects Directorate
STEM	Science, Technology, Engineering, and Mathematics
TD	Test Director
TEL	Transporter Erector Launcher
TIM	Technical Interchange Meeting
VACAPES	Virginia Capes Operating Area
VCSFA	Virginia Commercial Space Flight Authority
WBS	Work Breakdown Structure
WFF	Wallops Flight Facility

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Appendix B Definitions

This plan does not have any unique definitions.

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Appendix C WBS Dictionary

Element Number	Element Name	Element Description
1	Project Management	This WBS summing element contains the resources associated with the business and administrative planning, organizing, directing, coordinating, analyzing, controlling, and approval process used to accomplish overall project support objectives, which are not associated with specific elements below. This element includes project reviews and documentation, and project reserves.
2	Systems Engineering Support	This WBS summing element contains all of the resources associated with all engineering from functional specialists (excluding checkout/test and evaluation), which provide technical planning, technical management, analysis, and support efforts.
3	Safety	This WBS summing element contains all of the resources associated with flight safety, ground safety, and institutional safety.
4	Payload Support	This WBS summing element contains all of the resources associated with Cygnus Support.
5	Launch Vehicle Services Support	This WBS element contains the resources associated with Antares Launch Vehicle Services Support.
6	Range Facilities	This WBS summing element contains all of the resources associated with the design, development, and delivery of facilities.
7	Range Equipment	This WBS summing element contains all of the resources associated with Range Equipment.

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8	Integration and Test (Systems Level Only)	This WBS summing element contains all of the resources associated with all of the Integration and Test resources specifically related to and limited to Range Interface Test and L-1 FTS test.
9	Operations	This WBS summing element contains all of the resources associated with planning and documentation, rehearsal, instrumentation, safety, security, and range control.
10	Education and Public Outreach	This WBS summing element contains all of the resources associated with education and outreach.

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